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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/584,746	06/01/2000	Jeffrey Davidson	P-1518-US	5045

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EXAMINER	
VARTANIAN, HARRY	
ART UNIT	**PAPER NUMBER**
2634	8

DATE MAILED: 06/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/584,746	DAVIDSON ET AL.	
	Examiner	Art Unit	
	Harry Vartanian	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *4-7 and 11-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *5* is/are allowed.

6)☒ Claim(s) *4,6,7,11-13,15 and 16* is/are rejected.

7)☒ Claim(s) *14* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 June 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. *8* .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Detailed Action

Claim Objections

Claims are objected to because of the following informalities:

1. Claim 4 recites the limitation "said signal" in lines 10, 12, 15, 19, 20. There is insufficient antecedent basis for this limitation in the claim. Please change to "said signal activity". Appropriate correction is required.

2. Claim 4 recites the limitation "said I output signal" and "said Q output signal" in line 21. There is insufficient antecedent basis for this limitation in the claim. Please change to "said I filtered output" and "said Q filtered output". Appropriate correction is required.

3. Claim 5 recites the limitation "said signal" in lines 10, 11, 14, 21, 22. There is insufficient antecedent basis for this limitation in the claim. Please change to "said signal activity". Appropriate correction is required.

4. Claim 5 recites the limitation "said I output signal" and "said Q output signal" in line 23. There is insufficient antecedent basis for this limitation in the claim. Please change to "said I filtered output" and "said Q filtered output". Appropriate correction is required.

5. Claim 6 recites the limitation "said signal" in lines 10, 11, 12, 18. There is insufficient antecedent basis for this limitation in the claim. Please change to "said signal activity". Appropriate correction is required.

6. Claim 6 recites the limitation "said I output signal" and "said Q output signal" in line 19. There is insufficient antecedent basis for this limitation in the claim. Please change to "said I filtered output" and "said Q filtered output". Appropriate correction is required.

7. Claim 7 recites the limitation "said signal" in lines 10, 25, 12, 18. There is insufficient antecedent basis for this limitation in the claim. Please change to "said signal activity". Appropriate correction is required.

8. Claim 7 recites the limitation "said I output signal" and "said Q output signal" in line 26. There is insufficient antecedent basis for this limitation in the claim. Please change to "said I filtered output" and "said Q filtered output". Appropriate correction is required.

9. Claim 11 recites the limitation "said I output signal" and "said Q output signal" in line 14. There is insufficient antecedent basis for this limitation in the claim. Please change to "said I filtered output" and "said Q filtered output". Appropriate correction is required.

10. Claim 11 recites the limitation "A/D clock" in line 10. Please change to "Analog to digital(A/D) clock". Appropriate correction is required.

11. Claim 11 recites the limitation "(CVO)" in line 12. Please change to "(VCO)". Appropriate correction is required.

12. Claim 12 recites the limitation "said signal" in lines 4, . There is insufficient antecedent basis for this limitation in the claim. Please change to "said signal activity".

Appropriate correction is required.

13. Claim 13 recites the limitation "said signal" in lines 4, 7. There is insufficient antecedent basis for this limitation in the claim. Please change to "said signal activity". Appropriate correction is required.

14. Claim 14 recites the limitation "said signal" in lines 2, 3, 5. There is insufficient antecedent basis for this limitation in the claim. Please change to "said signal activity". Appropriate correction is required.

15. Claim 15 recites the limitation "said signal" in lines 2, 3. There is insufficient antecedent basis for this limitation in the claim. Please change to "said signal activity". Appropriate correction is required.

16. Claim 16 recites the limitation "said signal" in lines 2. There is insufficient antecedent basis for this limitation in the claim. Please change to "said signal activity". Appropriate correction is required.

17. Claims 4, 6, 13 are objected to because of the following informalities: they declare two pairs of matched filters, when the drawings only show one. The suggested way to correct this in Claim 4, for instance, is to change line 12 to "***said*** first matched filter" and line 15 to "***said*** second matched filter". Please correct 6 and 13 accordingly. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

1. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fasulo, II, Albert J. et al.(US Patent 5,742,639) in view of Lomp et al (US Patent No. 5,799,010) furtherer in view of Naden et al(US Pat 5,999,561). Fasulo's et al receiver is described to have two matched filters for the demodulated I and Q signals, "Outputs of the Hilbert Transform function are written to the in-phase (I) and quadrature (Q) phase input buffers of the detector 82...82 in conjunction with a matched filter recovers the shape of the QPSK symbols."(Column 7, Line 17-21) Furthermore, Fasulo et al discloses a processor having a decoder(Figure 2b, Item 114), a deinterleaver(Figure 2b, Item 89), FEC(Figure 2b, Item 77), and "...a multi-task control processor for controlling the operation of the signal processor."(Abstract) Fasulo et al also teaches the use of matched filters for his I and Q signals for timing and phase tracking(Column 7, Lines 7-24).

Fasulo et al does not disclose the processor's pre-tracking and tracking operation once a signal is detected.

However, Lomp et al discloses a receiver method where a "Pre-Track period immediately follows the acquisition or re-acquisition algorithms and immediately precedes the tracking algorithm."(Column 48, Lines 4-6) Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that Lomp's et al method of pre-tracking followed by tracking a signal after acquisition would be used in a receiver baseband apparatus. The motivation for combining Lomp's et al signal tracking method with Fasulo et al is that it ensures the validity of the received signal by pre-tracking prior to tracking(see Column 48, Lines 4-18).

Fasulo et al also fails to teach the use of AGC and fine frequency estimation. However, Naden et al discloses a receiver that uses AGC and fine frequency estimation. Naden et al states:

> "The analog signal is maintained within a predetermined signal level range, as controlled by an automatic gain control circuit (AGC) as shown. The output from the RF front end is provided to a first local oscillator section having a mixer 109, which translates the analog signal to a lower frequency by using a precise, and generally expensive, voltage controlled oscillator 110. By employing the precise voltage controlled oscillator 110, the position of the translated signal (i.e., a down converted signal), is controlled to within a narrow
> predetermined frequency range.
>
> In this conventional architecture, the analog AGC's function is to keep the signal level applied to the ADC 115 within an operational range of the ADC." **(Column 3, Lines 9-43)**
>
> "The loop filter algorithm 3230 first adjusts the coarse converter to the coarse frequency error 3232 and then the fine converter to the fine frequency error 3233 during frequency control loop settling.
>
> After the LO is locked to the receiver frequency reference, the receiver is reconfigured by changing the switch 3205 to position 2 in FIG. 32. The receive antenna 3201 feeds the conventional analog RF front end 3203 which includes an analog to digital converter (ADC) at its output. The downconvert coefficients in block 3210 are the computationally efficient Fs/4 set, as previously discussed, and thus a computational burden is minimal and may be shared by other receiver functions. The frequency locked loop drives the coarse and fine frequency errors 3232, 3233 between the transmitter and receiver and hence the decimation loss to zero." **(Column 45, lines 36-65)**

Therefor it would have been prima facie obvious at the time the invention was made for Fasulo's receiver to use AGC and fine frequency adjustment. A motivation to use AGC is stated above by Naden et al where he states that an AGC can be used to control receive

signal power levels(Column 3, Lines 40-42). A motivation to use fine frequency adjustment is implied by Naden et al, where he shows that it is common step after coarse frequency adjustment.

2. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fasulo, II, Albert J. et al.(US Patent 5,742,639) in view of Lomp et al (US Patent No. 5,799,010) furtherer in view of Naden et al(US Pat 5,999,561). Fasulo et al, Lomp et al, and Naden et al meet all the limitations of the Claim(see above paragraphs) including the use of I and Q soft decisions in Fasulo et al's receiver(Column 7, Lines 8-24).

Fasulo et al and Naden et al does not disclose the use of determining signal lock.

However, Lomp et al signal lock determination in column 47, line 64 to column 48, lines 39. The motivation for combining Lomp's et al with Fasulo et al is that Lomp et al describes signal lock as a necessary step needed to properly decode a signal.

3. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fasulo, II, Albert J. et al.(US Patent 5,742,639) in view of Lomp et al (US Patent No. 5,799,010) furtherer in view of Naden et al(US Pat 5,999,561). Fasul et al, Lomp et al, and Naden et al meet all the limitations of the Claim(see above paragraphs) except the specific DFT timing acquisition method. However, applicant admits that this is prior art on pg. 19.

4. Claim 11, 12, 13, 15, 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fasulo, II, Albert J. et al.(US Patent 5,742,639) in view of Lomp et al (US Patent No. 5,799,010) furtherer in view of Naden et al(US Pat 5,999,561) furtherer in view of Krishnamurthy et al(US Pat 5410368). Fasul et al, Lomp et al, and Naden et al meet all the

limitations of the Claim(see above paragraphs) including the use of a VCO in Column 4, Lines 12-28. they fail to teach a processor generating AGC, A/D, and VCO control signals.

However, Krishnamurthy et al discloses a demodulator that uses a processor to control an AGC, A/D converter, and VCO(Column 3, Line 3 to Column 4, Line 13). Therefor it would have been prima facie for the references to be combined, since the use of control signals between a programmed microprocessor and its components in a receiver are common.

Regarding Claim 12, the rejection for Claim 4 above also applies here. The signal decimation limitation is met by Naden et al in Column 11, Lines 19-33.

Regarding Claim 13, the rejection for Claim 4 above also applies here.

Regarding Claim 15, the rejection for Claim 6 above also applies here.

Regarding Claim 16, the rejection for Claim 7 above also applies here.

Allowable Subject Matter

5. Claim 5 is allowed.

6. Claim 14 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry Vartanian whose telephone number is 703.305.8698. The examiner can normally be reached on 10:00-6:30 Mondays to Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 703.305.4714. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Harry Vartanian
Examiner
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HV

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